

**UTILITY MODEL APPLICATION NO. 2587198**

**PRESSURE-SENSITIVE ADHESIVE SHEET**

[Translated from Japanese]

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PRESSURE-SENSITIVE ADHESIVE SHEET

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*[There are no amendments to this publication.]*

*[Translator's note: The source document may have been altered from the original Japanese to accommodate machine translation.]*

**Specification****[Title of the design]**

Pressure-sensitive adhesive sheet

**[Claim for registration of Utility Model]**

[Claim 1] A pressure-sensitive adhesive sheet structure comprising surface sheet 1, pressure-sensitive adhesive layer 3 having many small independent projections 2..., and release sheet 5 having many small independent recessed areas 4... that correspond to the above-mentioned many small independent projections 2... on release-treated side A, wherein the small projections on the above-mentioned pressure-sensitive adhesive layer 3 are in the form of square truncated pyramids, and the above-mentioned small projections 2... are independently arranged along the two axes at specific intervals so that spaces occurring in the axial directions lead to the outside as well when the pressure-sensitive adhesive surface of the above-mentioned pressure-sensitive adhesive layer 3 is lightly applied to an object.

**[Detailed description of the design]**

[0001]

[Field of industrial application] The present utility model pertains to a pressure-sensitive adhesive sheet.

[0002]

[Prior art] In general, conventional pressure-sensitive adhesive sheet has a structure comprising a pressure-sensitive adhesive sheet produced by coating a pressure-sensitive adhesive on a surface

sheet, and a release sheet is applied to the adhesive-coated surface. Furthermore, the release-treated surface of the release sheet is a flat surface. Upon application of the pressure-sensitive adhesive sheet, the release sheet is removed and the pressure-sensitive adhesive sheet is manually applied to the surface of the bonding object, in many cases.

[0003]

[Problems to be solved by the design]          However, in most cases, air is likely to be trapped between the pressure-sensitive adhesive sheet and the surface of the bonding object, and the area where the air is trapped forms a "blister" that shows up on the surface. The above-mentioned problem becomes more obvious when the area of the pressure-sensitive adhesive sheet is large (for example, 10 cm<sup>2</sup> or greater).

[0004] Furthermore, when the above-mentioned pressure-sensitive adhesive sheet is applied to certain types of plastic (for example, polycarbonate, acrylic, etc.), release of gases from the plastic occurs and "blisters" are produced, at times.

[0005] In addition, when the above-mentioned pressure-sensitive adhesive sheet is applied in the wrong place, re-application is required, but the pressure-sensitive adhesive sheet once applied exhibits very strong adhesion, and removal of the pressure-sensitive adhesive sheet and re-application are made very difficult due to rupturing of the sheet or wrinkles formed in the sheet.

[0006] The purpose of the present utility model is to eliminate the above-mentioned existing problems and to produce a pressure-sensitive adhesive sheet with an absence of "blisters" whereby re-application is made easy.

[0007]

[Means to solve the problem] In order to achieved the above-mentioned objective, the present utility model is a pressure-sensitive adhesive sheet comprising surface sheet 1, pressure-sensitive adhesive layer 3 having many small independent projections 2..., and release sheet 5 having many small independent recessed areas 4... that correspond to the above-mentioned many small independent projections 2... on the release treated side A, wherein the small projections on the above-mentioned pressure-sensitive adhesive layer 3 are formed into square truncated pyramids, and the above-mentioned small projections 2... are independently arranged in two axial directions at specific intervals so that spaces are formed in the two directions that lead to the outside when the pressure-sensitive adhesive surface of the above-mentioned pressure-sensitive adhesive layer 3 is applied lightly to an object.

[0008]

[Work of the design] When the release sheet is removed from the pressure-sensitive adhesive sheet of the present utility model and the adhesive surface is lightly bonded to the bonding object, the end member of each independent many small projections on the pressure-sensitive adhesive layer are bonded to the surface of the bonding object and at the same time, spaces connecting to the exterior are formed between the flat surface of the pressure-sensitive adhesive layer and the bonding object. Air can be easily removed from the above-mentioned space, and bonding can be achieved without formation of "blisters".

[0009] Furthermore, when the above-mentioned pressure-sensitive adhesive sheet is lightly bonded to the bonding object, the end member of the small projections alone are in contact with the bonding object; thus, the contact area is small. Therefore, when the sheet is applied in the

wrong place and removal and re-application are required, removal and re-application can be done easily.

[0010] Furthermore, when coating of a pressure-sensitive adhesive is done on a release-treated surface having many independent recessed members on the release sheet, a pressure-sensitive adhesive layer having many small projections can be easily produced.

[0011]

[Application Examples] In the following, the present utility model is explained in further detail with application examples.

[0012] Fig. 1 and Fig. 2 are application examples of pressure-sensitive adhesive sheet of concern in the present utility model, and the pressure-sensitive adhesive sheet is widely used for a variety of displays and decorations, and is a structure comprising surface sheet 1, pressure-sensitive adhesive layer 3 having many small independent projections 2..., and release sheet 5 many small independent recessed areas 4... that correspond to the above-mentioned many small independent projections 2... on release-treated side A.

[0013] In other words, the pressure-sensitive adhesive sheet main unit 6 where the surface of the pressure-sensitive adhesive layer is a pressure-sensitive adhesive surface comprising surface sheet 1 and pressure-sensitive adhesive layer 3, and the pressure-sensitive adhesive surface of the above-mentioned pressure-sensitive adhesive sheet main unit 6 is covered with release sheet 5 and comprises a pressure-sensitive adhesive sheet of the present utility model. Furthermore, many small projections 2... are formed on the flat base surface 3a of the pressure-sensitive adhesive layer 3.

[0014] In the above-mentioned application example, the small projections 2... on the pressure-sensitive adhesive layer each form square truncated pyramids in both directions at specific intervals (lattice pattern).

[0015] Fig. 1 shows an enlarged view in the thickness direction of the above-mentioned pressure-sensitive adhesive sheet.

[0016] It should be noted that a variety of shapes and sizes can be used for the pressure-sensitive adhesive sheet main unit and characters, codes, patterns, and combinations thereof as well as different colors can be formed on the opposite side from the adhesive surface.

[0017] In this case, for the material of surface sheet 1, paper or a plastic film can be used.

[0018] For the type of paper in this case, a variety of papers can be used, and a high quality paper with a basis of  $50 \text{ g/m}^2$  to  $200 \text{ g/m}^2$  can be used effectively.

[0019] Furthermore, for the type of plastic film used, polyester films, vinyl chloride films, etc. can be mentioned, and other plastics can be used as well. The thickness of the film is not especially limited, and in general,  $20 \text{ }\mu\text{m}$  to  $200 \text{ }\mu\text{m}$  is suitable.

[0020] For the material used for the pressure-sensitive adhesive layer, an adequate viscosity capable of forming small projections 2... is required, and a variety of pressure-sensitive adhesives can be used.

[0021] Furthermore, it is desirable when height H of the small projections 2... formed on the pressure-sensitive adhesive layer are in the range of  $3 \text{ }\mu\text{m}$  to  $50 \text{ }\mu\text{m}$ , and in the range of  $15 \text{ }\mu\text{m}$  to  $25 \text{ }\mu\text{m}$  is especially desirable.

[0022] For the material used for release sheet 5, paper, plastic film, etc. can be mentioned, but, when paper is used, the release-treated side A is laminated with a plastic such as polyethylene.



The thickness of the above-mentioned laminate is in the range of 5  $\mu\text{m}$  to 100  $\mu\text{m}$ , and in the range of 30  $\mu\text{m}$  to 50  $\mu\text{m}$  is preferable.

[0023] In addition, when a plastic film is used as the release sheet, films such as polyester, polypropylene, and polyethylene can be used.

[0024] In this case, the depth of the small recessed members 4 formed on the release sheet is the same as the height H of the small projections of the pressure-sensitive adhesive layer (approximately, 3  $\mu\text{m}$  to 50  $\mu\text{m}$ , preferably, 15  $\mu\text{m}$  to 25  $\mu\text{m}$ ). Furthermore, as shown in Fig. 1, the other side B of release sheet 5 is a flat, smooth surface.

[0025] In the following, the method of producing the pressure-sensitive adhesive sheet of the present utility model is explained.

[0026] First, many small independent recessed areas are formed on the release-treated side A of the release sheet by means of embossing or printing.

[0027] When the above-mentioned small recess members 4... are produced by a printing process, small projections are formed by printing in the areas other than the areas where the above-mentioned small recessed members are to be formed.

[0028] Subsequently, a silicon resin is coated on the surface where the small recess members are formed to produce release-treated side A.

[0029] Furthermore, a pressure-sensitive adhesive is coated on the release-treated side A coated with the silicon resin. In this case, a portion of the pressure-sensitive adhesive coated fills the small recessed members of the release sheet.

[0030] When the above-mentioned pressure-sensitive adhesive is dried, pressure-sensitive adhesive layer 3 is formed.

[0031] In this case, the pressure-sensitive adhesive inside the small recessed members solidifies in a form that has a shape that nearly matches the shape of the small recessed members and small independent projections can be produced.

[0032] Surface sheet 1 is brought into contact with the pressure-sensitive adhesive layer on the opposite side from the release sheet side.

[0033] In this manner, pressure-sensitive adhesive layer 3 and release sheet 5 are firmly bonded and pressure-sensitive adhesive main unit 6 is produced.

[0034] The pressure-sensitive adhesive sheet of the present utility model is produced as described above.

[0035] The release sheet alone can be easily removed from the pressure-sensitive adhesive sheet of the present utility model produced as explained above, and the pressure-sensitive adhesive layer of the pressure-sensitive adhesive sheet main unit has many small projections.

[0036] When the above-mentioned pressure-sensitive adhesive sheet main unit is lightly applied to a bonding object (not shown in the figure), the end member of the small projections alone are brought into contact with the surface of the bonding object, and spaces are formed between the pressure-sensitive adhesive layer and the surface of the bonding object in the areas other than the small projections. In other words, initially, spaces are formed between flat base 3a of the pressure-sensitive adhesive layer 3 and the surface of the bonding object.

[0037] Since air escapes from the above-mentioned space, entrapped air can be easily removed.

[0038] Furthermore, when the above-mentioned pressure-sensitive adhesive sheet main unit is applied lightly to the bonding object, the contact area of the pressure-sensitive adhesive layer is small, thus, when applied by mistake, removal can be easily accomplished and re-application can

be done easily.

[0039] In this case, the small projections of the pressure-sensitive adhesive layer undergo plastic deformation a certain time after application, and the contact area is increased, and firm bonding can be achieved.

[0040]

[Effect of the design] The features below can be achieved from the present utility model having the above-mentioned structure.

[0041] Spaces that lead to the outside are formed in all directions between the pressure-sensitive adhesive surface and the surface of the bonding object with the exception of the small projections when the pressure-sensitive adhesive surface of the pressure-sensitive adhesive layer is applied lightly to the bonding object, entrapped air between the pressure-sensitive adhesive layer and the bonding object can be easily and surely removed, and formation of "blisters" can be avoided. As a result, manual application of the pressure-sensitive adhesive sheet can be done easily and rapidly.

[0042] Furthermore, when lightly applied, the contact area is small, and when the sheet is applied by mistake, removal and re-application can be done easily.

[0043] Furthermore, when gas formation occurs between the pressure-sensitive adhesive sheet and bonding object for some reason, the gas generated can be easily removed from the space formed between the adhesive surface and the surface of the bonding object and formation of "blisters" can be avoided in this case as well.

**[Brief description of figures]**

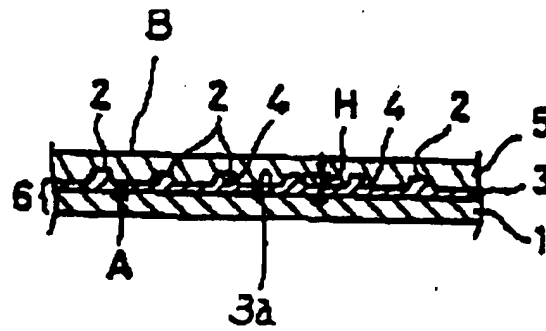
[Fig. 1]        The figure is an enlarged view in the thickness direction of the above-mentioned pressure-sensitive adhesive sheet.

[Fig. 2]        A perspective view used for explanation of the principle areas.

**[Explanation of codes]**

- 1        Top sheet
- 2        Small projections
- 3        Pressure-sensitive adhesive layer
- 4        Small recessed areas
- 5        Release sheet
- A        Release-treated surface

**[Fig. 1]**



**[Fig. 2]**

